

- 2.—*South African Crustacea* (Part VIII. of S.A. Crustacea, for the Marine Investigations in South Africa).—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Memb. New Zealand Inst., Hon. Fellow Worcester College, Oxford.

(Plates XIII.–XXV. of Vol. XV. Plates LXXVII.–LXXXIX. of Crustacea.)

IN the General Catalogue of South African Crustacea (Ann. S.A. Mus., 1910) forty-nine species were enumerated under the heading of *Macrura Genuina*. To this list twenty-eight species were subsequently added (Ann. S.A. Mus., 1914). Of the twenty-two species considered in the present essay eleven are proposed as new, one of them representing a new genus. As nineteen are additional to the two earlier lists, the total of the group in question stands for the moment at ninety-six species. In other divisions of the crustacean class a large number of new species have been added to the South African fauna by various authors, especially Dr. G. S. Brady and Mr. K. H. Barnard, since the publication of the General Catalogue. In any future revision of it attention would have also to be directed to several older species, the habitat of which in these waters as recorded by Lenz and others I overlooked. To undertake such a revision just now would perhaps be premature, and at any rate on the present occasion is not convenient. But I venture to take this opportunity of cordially thanking Mr. W. H. Bell-Marley, of Durban, for the large number of specimens with which he has favoured me during a course of years from the coast of Natal, effectively corroborating the work of Krauss, who made that coast his principal hunting ground.

In addition to specimens already acknowledged in this series, Mr. Bell-Marley has sent the following:—

Dehaanius dentatus (Milne-Edwards), with varieties.

Blastus fascicularis (Krauss).

Huenia proteus, de Haan, new to S. African fauna.

Pilumnus xanthoides, Krauss.

- Eriphia smithii*, McLeay.
Callinectes gladiator (Fabricius), new to S. African fauna.
Charybdis cruciatus (Herbst), small specimens.
Lupa sanguinolentus (Herbst).
Thalamita prymna (Herbst).
Cyclograpsus punctatus, Milne Edwards.
Ocypode cordinanus, Desmarest.
Hymenosoma orbicularis, Desmarest, carrying a comparatively large *Balanus*.
Matuta lunaris (Forskål).
 ? *Leucisca squalinus*, McLeay.
Clibanarius virescens (Krauss).
Diogenes extricatus, Stebbing.
Porcellana dehaanii, Krauss.
Macropetasma africanus (Balss).
Leander affinis (Milne Edwards).
Alpheus edwardii (Audouin).
Gonodactylus chiragra (Fabricius).
Talorchestia africanus, Bate.
Anthosoma crassus (Abildgaard), on old shark. New to S. African fauna.
Balanus capensis, Darwin, on *Hymenosoma orbicularis*.

TRIBE THALASSINIDEA.

(See these Annals, vol. 15, pt. 1, p. 8, 1914.)

FAMILY AXIIDAE.

1888. *Axiidae*, Bate, Rep. Voy. Challenger, vol. 24, p. 36.
 1891. „ Ortmann, Zool. Jahrb., vol. 6, p. 46.
 1914. „ Stebbing, Ann. S. African Mus., vol. 15, pt. 1, p. 9.

GEN. CALOCARIS, Bell.

- (1847) 1853. *Calocaris*, Bell, Brit. Stalk-eyed Crust., p. 231.
 1888. „ Bate, Rep. Voy. Challenger, vol. 24, pp. 7, 54
 (*Callocaris*, pp. 11, 46).
 1895. „ Faxon, Mem. Mus. Comp. Zoöl., vol. 18,
 p. 105.
 1900. „ McArdle, Ann. Nat. Hist., Ser. 7, vol. 6,
 p. 476.

1914. *Calocaris*, Stebbing, Ann. S. African Mus., vol. 15, pt. 1, p. 9.

Other references for the family and genus are given in the last-mentioned paper.

CALOCARIS ALCOCKI, McArdle.

1900. *Calocaris alcocki*, McArdle, Ann. Nat. Hist., Ser. 7, vol. 6, p. 476.
1901. „ „ Alcock, Catal. Indian Deep-sea Macrura, pp. 189, 190; Zool. Investigator, Crust., pt. 9, pl. 50, figs. 4, 4a.

McArdle's specimen, measuring 54 mm. in length, was taken in the Bay of Bengal, off Ceylon, from a depth of 542 fathoms. The description given of it essentially fits the South African example. Thus, to quote from Alcock, "the rostrum, which reaches to the end of the antennular peduncle, is up-curved and dorsally grooved; on either lateral border, near the middle, are 1 or 2 spines, and on each of the epigastric continuations of the lateral borders is a single spine." In our specimen the upturned apex of the rostrum reaches somewhat beyond the peduncle of the first antennae, but so it appears to do in the figure on Plate 50 of the Investigator's Crustacea. It may be only an accidental coincidence, but it may be noticed that the African rostrum has 2 spines on the left margin and only 1 spine on the right. The considerable length of the penultimate joint in the peduncle of the second antennae as compared with the terminal joint should be noticed, as it is a mark distinguishing this species from the recently established *C. barnardi*. Only one of the flagella was preserved in the first antennae, and the same seems to have been the case with the Indian specimen, which, however, retained the flagellum of the second pair, missing in ours. No special notes are given on the mouth-organs of the Indian specimen, except that the fourth joint of the third maxillipeds "has a subterminal spine on the inner border." This applies equally to ours, if we accept the term spine as signifying a small unjointed tooth. In *C. barnardi* this tooth is also present, though much obscured by the crowded setae, but that species shows a great difference in the denticulate border of the third joint, having some nine strong teeth in place of the 28 mixed large and small which form the row in the present species, in addition to an irregu-

larly placed dozen of minute ones at the base. A comparison of the figures for the two species will show rather considerable differences of detail in the maxillae and other maxillipeds. But without more specimens for control it may be imprudent to lay too much stress on such details.

A detached first peraeopod, beginning with the third joint, and measuring 23 mm. in length, agrees well with Alcock's account of the large chelipeds in the female, having the hand as long as the fourth and fifth joints combined (carpus and merus being evidently intended, in agreement with the figure, not "carpus and ischium" as printed), the fifth joint is two-thirds the length of the palm, and the palm is as long as the fingers; there is a terminal tooth on the lower border of the third joint and on the upper border of the fourth joint and the palm. In the second peraeopods the last three joints measure together 6.5 mm., equally divided between the wrist, palm, and fingers, while the fourth joint, 7.5 mm. long, exceeds the whole combination. The three following peraeopods appear to have a total length respectively of 25, 24, 21 mm., the apical part of the sixth joint in all, but especially in the fifth pair, and the fingers being copiously furnished with setae.

The pleopods are perplexing. A comparison of the figures will show that the first pair in this species differs from that of *C. barnardi*. The second pair of the present species would, I imagine, apart from contradictory evidence, be regarded as male organs. But Alcock is evidently describing these organs when he writes: "In the female the protopodite and endopodite of the second pair of abdominal appendages are long and rigid, and articulated to the tip of the endopodite is a large boot-shaped plate, its toe pointing backwards and its heel armed with a spine." The sole, it will be seen, is fringed with spinules. In describing the family Axiidae Alcock says: "In the Indian species from the deep sea it is common to find orifices, corresponding with the genital orifices of the male, in adult females." In defining the genus *Calocaris* he says: "The first pair of abdominal appendages are slender and uniramous in both sexes, the 2nd-5th pairs are slender and biramous, and have a slender styliform internal appendix." This appendix I have sought in vain in the present species. The characters of the telson and uropods are sufficiently shown in the figures, the diaeresis in the exopod of the latter incomplete.

The total length of the specimen was about 33 mm., the carapace 13 mm. including the rostrum, the telson 4.5 mm. The plate illustrating this species is reserved for future publication.

Locality. Cape Natal, N. by E., 24 miles; depth 440 fathoms. A 1550.

TRIBE SCYLLARIDEA.

This tribe, established as the "Tribu des Scyllariens" by Milne-Edwards in 1837, has been already noticed in these Annals, vol. 6, part 1, p. 28, 1908, and vol. 6, part 4, p. 372, 1910.

FAMILY SCYLLARIDAE.

With the above-mentioned notices of the tribe will be found many references to the literature of the family. As might have been expected, the singular bodily shape and the spade-like second antennae of the "Mother-lobsters" have excited attention in very early times. Linnaeus, however, in 1758 was content to group all the forms then known as a single species, *Cancer arctus*. To determine which of them, according to modern rules, has a right to the specific name *arctus* requires some consideration.

In the *Fauna Suecica*, ed. 2, p. 496, No. 2040, 1761, Linnaeus again named *Cancer arctus*, but this time with a single reference, "Rumph. mus. t. 2. f. C. D." These figures illustrate what were supposed to be the two sexes of *Ursa-Cancer*, Rumphius, as described in his *D'Amboinsche Rariteitkamer*, Book 1, p. 3, 1705. Fig. C is now referred to *Parribacus*, Dana, and Fig. D to *Thenus*, Leach. By strict rule perhaps, therefore, *arctus* should be a species of one or the other of those two genera, but as the habitat is restricted to *Oceano septentrionali*, it is possible that Linnaeus was referring to yet a third species, an indefiniteness and confusion which may justify us in leaving the "*Fauna Suecica*" out of account. We next come to *Cancer arctus* in the *Systema Naturae*, ed. 12, vol. 1, part 2, p. 1053, 1767. Here we have the old distribution over the four quarters of the globe and contradictory references to the two figures in Rumphius and the single figure in Browne's *Jamaica* and the very different one in Seba's *Thesaurus*, but the reference to the "*Fauna Suecica*" is also given, and contrary to custom a comparatively full description is appended, as if drawn up from an

actual specimen. With regard to the application of this description I asked the advice of my friend, Dr. W. T. Calman, D.Sc., who, after consulting with his colleague, Mr. C. Tate Regan, writes: "He agrees with me that it applies very well indeed to a specimen of '*Scyllarus arctus*,' but cannot, by any stretch of imagination, be made to fit specimens of '*Parribacus antarcticus*' or of '*Thenus orientalis*.' . . . Only *S. arctus* can be described as 'aculeis inter oculos circiter 10' or as having the carapace 'quinquefariam antrorsum aculeatus.' The description of the 'cauda' puzzled me a good deal till Mr. Regan pointed out that the grooves on each abdominal somite except the first and last do really define three areas, the first smooth, the second rough, and the third rough and triply emarginate behind. Regan also makes the suggestion which I think probably right, that 'digito brevissimo' refers to a very minute tooth on the concave margin of the dactylus of the first peraeopods."

In 1775, as Gill, Miss Rathbun, and Sherborn have stated, Fabricius instituted the genus *Scyllarus* for *Cancer arctus*, Linn. To this genus he added the species *S. australis* in 1781, and again recorded these two species in 1793 (Ent. Syst., vol. 2, p. 477), without reference to his own earlier records or any indication that the genus was not a new one. Under *S. arctus* he gives the old cosmopolitan distribution and mixture of references, as though quite unaware that they belong to a variety of species, here also as in 1781 quoting Rumph. Mus. tab. 2, fig. 6, D, by mistake for C, D. My own mistake in 1908 must be acknowledged. It consisted in accepting 1793 as the date for the genus *Scyllarus* and the species *S. australis*, in place of 1775 for the one and 1781 for the other. The year 1793, however, is rather deeply involved in the interests of the present family. For while Fabricius was leaving his genus in its primitive disorder, two of his contemporaries were independently making a systematic revision of it. Herbst (Krabben und Krebse, vol. 2, part 3, pp. 80, 82, 83, pl. 30, figs. 1, 2, 3), mentioning but not adopting *Scyllarus*, assigns to *Cancer (Astacus)* three species which he named respectively *arctus*, *ursus major*, *ursus minor*. Here it should be noted that the invaluable "Index Animalium" makes a slight slip by assigning these three names to 1792, which would have been correct had the descriptions occurred in part 2, ending with p. 78, but Sherborn now accepts Miss Rathbun's date 1793 for parts 3 and 4 of Herbst's second volume. This robs Herbst of any unquestionable precedence over N. T. Lund, who in the same year 1793 (Acta Hafn. or Skrivter af Naturhistorie-Selskabet, vol. 2,

part 2, p. 17, Slaagten *Scyllarus*) distinguished as species of *Scyllarus*: 1. *arctus* (Linn.); 2. *aequinoctialis*; 3. *antarcticus*; 4. *orientalis*. In this brief but admirable treatise Lund compares and distributes the illustrative figures from various authors, which had been so absurdly referred to a single species. At the same date Herbst gives a confused synonymy to his *Cancer* (*Astacus*) *arctus* (including *Scyllarus arctus*, Fabricius), but his description and figure make it quite clear that the species is *not* the *Cancer arctus* of Linnaeus discussed above, and further that it *is* the *Scyllarus orientalis* of Lund. Consequently, as the name *arctus* is preoccupied, Herbst's species so-called becomes a synonym of Lund's *orientalis*, subsequently referred to the genus *Thenus*, Leach.

Herbst's second species, *Cancer* (*Astacus*) *ursus major*, competes with Lund's third, *Scyllarus antarcticus*; since both writers agree in identifying the species with Rumph's tab. 2, fig. C, and Seba's tab. 20, fig. 1. Lund's specific name is misprinted *antarcticius* in the Suppl. Ent. Syst. of Fabricius, 1798, and misquoted as *ant-articus* by Milne Edwards in 1837. The latter author gives *C. ursus*, Seba, as the name applying to Seba's pl. 20, f. 3 [error for f. 1]. But Guérin, in the description of that plate (as reproduced in 1827) writes: "No. 1. *Ursa-cancer*, seu *Squilla lata*, *amboinensis*, Seb.—*Scyllarus antarcticus*, Fabricius." De Haan (Crust. Japon., decas 5, p. 133, 1841), has already called attention to the difference of Rumph's fig. C from others supposed to be identical. But Herbst's figure of *ursus major* and that which Milne-Edwards gives of *Ibacus antarcticus* in the illustrated edition of the "Règne Animal," pl. 45, fig. 3, are in good agreement, and Herbst's specific name having been accompanied by an excellent coloured figure from the first, should have a preference over Lund's name of the same date, but with a bare description. The species, after its transfer by Milne Edwards to *Ibacus*, Leach, was again transferred by Dana in 1852 to a new genus, *Parribacus*. Immediately after this transfer Dana proceeds to describe it as *Ibacus antarcticus* (Rumph), in U.S. Expl. Exp., vol. 13, p. 517, 1852, although Rumph has nothing to do with either the generic or the specific name, and was probably concerned with a different species of the genus. Herbst's figure is without the row of tubercles down the centre of the carapace, which are conspicuous in Seba's and Dana's figures and faintly marked in that given by Milne Edwards; but this detail does not appear to be important. The acceptance of the name *Parribacus ursus* (Herbst) in place of *Parribacus antarcticus* (Lund) has the advantage of displacing a name so puzzling and inappropriate as *antarcticus* for

a species recorded from the East Indies, Japan, and the Samoa Islands. There is a *Cancer ursus*, Fabricius, but that does not pre-occupy the use of the specific name in the clearly different genus *Cancer* (*Astacus*). Herbst's third species, *ursus minor*, instead of being a variety of *ursus major*, is accepted as a synonym of *Scyllarus arctus*. Lund's remaining species, *aequinoctialis*, is the type of *Scyllarides*, Gill. Hence each of the four species which Lund acutely distinguished stands now under a separate generic name, *Scyllarus*, *Scyllarides*, *Parribacus*, *Thenus*. Balss in his important treatise on East-Asiatic Decapoda (Abhandl. K. Bayer. Ak. Wiss., vol. 10, Suppl. 2, p. 81, 1914) states that "*Paribaccus papyraceus* Rathbun 1906," is a synonym of "*Paribaccus antarcticus* (Rumph.)," in his spelling of the generic name being no doubt misled by Bate's change of *Ibacus* into *Ibaccus*, which he also adopts, without noticing that the authors whom he cites usually follow Leach and Dana, though *Parribacus* is sometimes changed to *Paribacus*.

GEN. THENUS, Leach.

- 1815. *Thenus*, Leach, Trans. Linn. Soc. London, vol. 11, p. 338.
- 1816. „ Leach, Encycl. Britannica, ed. 5, Supplement, pp. 417, 419, Art. Annulosa.
- 1825. *Scyllarus* (part), Desmarest, Consid. gén. Crustacés, p. 181.
- 1837. *Thenus*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 285.
- 1841. „ de Haan, Crust. Japonica, decas 5, p. 151.
- 1852. „ Dana, U.S. Expl. Exp., vol. 13, p. 516.
- 1888. „ Bate, Rep. Voy. Challenger, vol. 24, pp. 56, 65.
- 1891. „ Ortmann, Zool. Jahrb., vol. 6, p. 38.
- 1893. „ Stebbing, Hist. Crust., Internat. Sci. Ser., vol. 74, p. 193.

In his Zoological Miscellany, vol. 2, p. 152, 1815, Leach remarks that "*Ibacus* is one of four distinct genera that have been confounded under the general appellation *Scyllarus*." He presently instituted the genus *Thenus*, to which Dana added *Parribacus* in 1852. The characters given by Leach for distinguishing *Thenus* from *Scyllarus* were, "*Hinder legs with simple tarsi. Thorax subdepressed, broader anteriorly. Eyes inserted at the anterior angles of the thorax.*" The last character is emphasized by Herbst in his description of the type species by the remark that "in no single known insect do the eyes stand so far apart." Ortmann uses this character and the non-chelate fifth peraeopods of the female to distinguish

Thenus from *Scyllarus*, *Ibacus*, and *Parribacus*. The mouth-parts of the different genera are described by de Haan, whose work also shows that, while there are 21 pairs of branchiae in *Scyllarides*, *Parribacus*, *Ibacus*, and *Thenus*, there are only 19 pairs in *Scyllarus*. As, according to Miss Rathbun, *Scyllarus americanus*, S. I. Smith, is usually not more than half an inch long, great size is not an invariable characteristic of the "Mother-Lobsters."

THENUS ORIENTALIS (Lund).

1705. *Ursa Cancer*, Rumphius, D'Amboinsche Rariteitkamer, vol. 1, p. 3, pl. 2, fig. D.
 1758. *Cancer arctus* (part), Linn., Systema Naturae, ed. 10, p. 633.
 1775. *Scyllarus arctus* (part), Fabricius, Syst. Entom., p. 413.
 1793. " " " Fabricius, Ent. Syst., vol. 2, p. 477.
 1793. *Cancer (Astacus) arctus*, Herbst (not *arctus*, Linn., sensu strictiore), Krabben and Krebse, vol. 2, part 3, p. 80, pl. 30, fig. 1.
 1793. *Scyllarus orientalis*, Lund, Skrivter Nat.-Hist.-Selsk., vol. 2 part 2, p. 22.
 1798. " " Fabricius, Suppl. Ent. Syst., p. 399.
 1803. " " Latreille, Hist. Nat. Crust. Ins., vol. 6, p. 181.
 1815. *Thenus indicus*, Leach, Trans. Linn. Soc. London, vol. 11, p. 338.
 1816. " " Leach, Encycl. Brit., ed. 5, Suppl., p. 419.
 1825. *Scyllarus orientalis*, Desmarest, Consid. gén. Crust., p. 182, pl. 31, fig. 1.
 1837. *Thenus orientalis*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 286, and Règne Animal, illustr. ed. undated, pl. 45, figs. 2a-c.
 1888. " " Bate, Rep. Voy. Challenger, vol. 24, p. 66.
 1888. " " de Man, J. Linn. Soc. London, vol. 22, p. 261.
 1891. " " Ortmann, Zool. Jahrb., vol. 6, p. 46.
 1914. " " Balss, Abhandl. K. Bayer, Ak. Wiss., vol. 10, Suppl. 2, p. 80.

Ortmann assigns the species to Rumph, though without using Rumph's name for it. Jonston, Hist. Nat. de Exangvibus aquaticis, p. 21, pl. 4, figs. 3, 4, 8, 12, 1767, adopts the name *Ursa major* for three figures, 3, 4, 12, which on his

plate are called *Squilla lata*, while fig. 8 is named *Squilla Ursa minor*. The last appears to be *Scyllarus arctus*, and the position of the eyes suggests that fig. 3 is intended to represent *Thenus orientalis*. But as Jonston's work has been ruled out of court among treatises not consistently binomial, a discussion of his rude figures may be dispensed with.

The South African specimen is in unmistakable agreement with the illustrations by various authors cited in the synonymy. Milne Edwards speaks of the ocular peduncles in this genus as very long, no doubt meaning comparatively rather than absolutely. They enable the small cornea to project only very slightly beyond the lateral borders of the carapace. The stomach in our specimen is protruded, as happens sometimes with animals brought suddenly to the surface from a considerable depth. The first and second segments of the pleon have each a small medio-ventral process, the second much the smaller. Length of the specimen along the middle line, from the base of the cavity of the frontal process to the end of the telson 139 mm., breadth across front just behind the eyes 81 mm. Herbst says that the flesh of the animal is good eating, better than that of the lobster, as Rumph had observed many years earlier, though for actual comparison of flavours one would not expect *Astacus gammarus* to have been common in Amboyna, and *Thenus orientalis*, which is rare even in the East, can seldom have come to table in Germany.

Locality. Amatikulu River NW. by W. $\frac{1}{2}$ W. 12 miles (Natal); depth 26 fathoms. A 969.

TRIBE PENAEIDEA.

FAMILY PENAEIDAE.

(See these Annals, vol. 15, pt. 1, p. 11, 1914.)

GEN. SOLENOCERA, Lucas.

1850. *Solenocera*, Lucas, Ann. Soc. Entomol. de France, Ser. 2, vol. 8, p. 219.
 1884. „ Koelbel, SB. Ak. Wiss., Wien, vol. 90 (1885), pt. 1 (1884), p. 314.

1885. *Solenocera*, S. I. Smith, Pr. U.S. Mus., vol. 8, p. 185.
 1895. „ Faxon, Mem. Mus. Comp. Zoöl., vol. 18, p. 183.
 1901. „ Alcock, Catal. Indian Deep-sea Macrura, p. 19.
 1908. „ Bouvier, Camp. Sci. Monaco, fasc. 33, p. 86
 (with synonymy, p. 87).
 1910. „ Kemp, Fisheries Ireland, 1908, i., pp. 13, 20.
 1911. „ de Man, Siboga Exp., Mon., 39a, pp. 7, 45.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10,
 Suppl. 2, p. 5.

SOLENOCERA COMATUS, n. sp.

Plates LXXVII., LXXVIII.

The carapace is scabrous, the rostrum directed straight forward, only twice as long as deep, the medio-dorsal carina having a tooth just in front of the cervical groove, followed by a series of four teeth of which the hindmost is just behind the base of the orbit and the foremost separated by a distinct interval from the apical point; below this point the margin descends with a gentle curve adorned by a conspicuous series of plumose setae, to which the specific name alludes. Behind this series the lower margin of the rostrum is horizontal. The sides of the carapace have an antennal tooth and an antero-lateral, and on the surface a tooth a little above and behind the antennal with an apex not quite reaching the margin, and a tooth at the lower end of the cervical groove. The fourth, fifth, and sixth pleon segments are carinate, the sixth ending in a distinct tooth. The telson is shorter than the uropods, ending acutely, for nearly two-thirds of its length to the rear fringed with plumose setae, the last third narrow, with a pair of slightly divergent processes at its base which are not quite half its length.

The eyes are brownish red, short, with large oval cornea, protected by the first joint of the first antennae, this joint being as long as the second and third joints combined and having two small lateral teeth. The flagella are not quite twice the length of the peduncle, one flagellum about two-thirds the breadth of the other. In the second antenna the apical tooth of the scale reaches just beyond the setose margin; the flagellum (imperfect) considerably exceeds the length of the body.

The mandibular palp is very large and setose, with a twist at the base of the first joint, which is decidedly wider and not shorter than the long second, that being wide at the base, distally quite narrow. The plates of the lower lip are in close contact, longer than broad.

The "palp" of the first maxilla has a series of 5 long setae on the inner margin near the apex. The apical plate of the second maxillae has at the tip of its inner margin a notable tooth carrying spines on both edges and 3 on the surface. The long sinuous endopod of the first maxillipeds has a spaced row of very long setae on its sixth joint. The third maxillipeds are elongate, as is usual in the genus. The first peraeopods are short, the second and third joints each produced into a tooth, the fourth rather longer than the fifth, the fifth longer than the sixth, the fingers rather less than twice the palm, their confronting margins armed with teeth distally for less than half the length. The cleansing apparatus of denticulate spines occurs near the apex of the wrist, and proximally on the palm. What remains of the fifth peraeopod is long and slender.

The first pleon segment is ventrally produced into a short triangular process beset with slender spines, between the stout peduncles of the first pleopods. Of these the outer ramus is long and doubly serrate with the usual furniture of plumose setae; the inner ramus, attached much higher up, is short, pellucid, much of the feebly serrate outer margin fringed with setae, of which there are several also on the surface, while the smooth inner margin has but a single seta pointing inward near the base; the apex of this ramus is pointed, but the outer margin some way from the end forms a little oval lobe carrying a setule, before contributing to the apex proper.

The inner branch of the uropods is subequal in length to the telson, and has the end ovate, fringed round with plumose setae; the wider and considerably longer outer ramus has the outer margin straight, unarmed, its little apical tooth about on a level with the distal margin which at starting is only feebly convex.

The specimen measured 46 mm., the carapace with rostrum being 15 mm., the pleon 31 mm., of which the sixth segment and the telson each accounted for 6 mm. The flagella of the first antennae were about 16 mm. long, with 53 jointlets in the broader and 46 in the narrower flagellum, or thereabouts, for the counting is not easy. The imperfect flagellum of the second antenna was 60 mm. long, the third maxilliped 18 mm.

Locality. 33° 6' S., 27° 55' E.; depth 43 fathoms. A 1218.

Since the above description was written a male specimen from a neighbouring station has been observed, from which it will be convenient to supply some further details. The total length was practically the same, being 47 mm. Here the medio-dorsal carina has only 4 teeth, the 2 anterior teeth being rather far from the next to

the rear. The hands and fingers of the second and third peraeopods are very slender, the movable finger in each case extending somewhat beyond the fixed one. The fifth peraeopod is more slender and much less setose, but longer than the fourth, the difference in length of the fourth, fifth, and sixth joints being very marked, while the fingers are subequal, but the sixth joint in the fifth pair more than twice as long as the finger, in the fourth pair not more than once and a third of the finger's length.

The petasma, when unfolded and flattened, is seen to consist of two symmetrical conjoint halves, each ending in a rather broad, roughly oval lobe fringed on the outer end with 15 little teeth or spicules and on the inner end with 8 that are blunter but still microscopic. Before these transverse overlapping lobes are reached, each division has on its outer (inward folding) side a longitudinal lobe ending obtusely, although a thickening of the otherwise pellucid membrane gives the appearance of an inward curled hook. The second pleopods at the base of the endopod carry a trilobed process, one lobe unarmed extended outwards, the other two downwards on the inner side, one with a furniture of setae, the other with a small fringe of setules.

Locality. Nicea River, N. by W. 6 miles (near East London); depth 50 fathoms. A 1217.

GEN. PENAEUS, J. C. Fabricius.

(See these Annals, vol. 15, pt. 1, p. 12, 1914.)

PENAEUS SEMISULCATUS, de Haan.

1849. *Penacus semisulcatus*, de Haan, Crust. Japonica, decas 6, p. 191, pl. 46, fig. 1.

1911. „ „ de Man, Siboga Exp., vol. 39a, p. 97.

A specimen 148 mm. in length, with flagellum of the second antennae 245 mm. long, appears to belong to this species. It has a very small exopod on the fifth peraeopods, and the telson strongly sulcate. The petasma agrees well with that figured by Kishinouye for his *P. ashiaka*, which Dr. de Man identifies with *P. semisulcatus*, though not noticing the striking difference in length between the flagella of the first antennae as figured by Kishinouye for both sexes of *P. ashiaka* and those figured by de Haan for *P. semisulcatus*. The length represented by de Haan is exceeded by that in our specimen.

A female 160 mm. long (with telson slightly imperfect) has a thelycum corresponding with that figured by Alcock for *P. monodon*, which de Man supposed later to be *P. semi-sulcatus*. In this specimen the rostrum has 5 small ventral teeth instead of the usual three.

Locality. Delagoa Bay. A 2128-9. The specimen was obtained by Mr. K. H. Barnard in October 1912.

GEN. PENAEOPSIS, A. Milne-Edwards.

(For synonymy see these Annals, vol. 15, part 1, p. 15, 1914.)

PENAEOPSIS MONOCEROS (Fabricius).

- 1798. *Penaeus monoceros*, Fabricius, Supplementum Ent. Syst., p. 409.
- 1906. *Metapeneus monoceros*, Alcock, Catal. Indian Macrura, p. 18, pl. 3, figs. 7, 7a-c. (with synonymy).
- 1911. *Penaeopsis monoceros*, de Man, Siboga Exp., vol. 39a, pp. 8, 55.
- 1913. " " de Man, Siboga Exp., vol. 39a, Suppl., pl. 6, figs. 14a-c.
- 1914. " " Balss, Abhandl. K. Bayer, Ak. Wiss., vol. 10, Suppl. 2, p. 7.

Dr. de Man distinguishes two sections in this genus. The first, to which this species belongs, he defines as follows: "No marginal subterminal articulating spines on the telson; last pair of thoracic legs without exopod; their merus in the adult male, with a notch and spine or tooth at its proximal end." The presence of this tooth in the adult male helps to distinguish this species from *P. spinulicauda*, Stebbing, 1914.

The specimen examined has 9 dorsal teeth on the carapace, the hindmost remote from the others, the end of the rostrum slightly upturned. The carapace has a length of 37.5 mm., the rostrum from the base of the eyes accounting for 15.5 mm.; the pleon is 68.5 mm. long, bringing the total to 106 mm. The flagellum of the second antenna measured 180 mm., this being probably its full extent, as it had to be extracted from what appeared to be secure shelter within the carapace and other parts of the animal. The slender fifth pereopods were also protected by the carapace. Another specimen, 116 mm. long, has the flagellum of second antennae 225 mm. long, the flagella of the first pair only about 10 mm. in length.

Locality. Delagoa Bay. A 2128-9. The specimen was obtained by Mr. K. H. Barnard in October 1912. Another specimen, female, length 163 mm., flagellum of second antennae 430 mm., was earlier obtained by Dr. Gilchrist, together with a male of nearly the same size, off South Head of Tugela River, in depth between 12 and 14 fathoms, No. 149.

TRIBE CARIDEA.

(See these Annals, vol. 15, part 1, p. 28, 1914.)

FAMILY CRANGONIDAE.

- 1853. *Crangonidae*, Bell, British Stalk-eyed Crustacea, p. 255.
- 1910. „ Stebbing, Ann. S. Afr. Mus., vol. 6, p. 382 (with synonymy).
- 1914. „ Balss, Abhandl. K. Bayer, Ak. Wiss., vol. 10. Suppl., 2, p. 61.
- 1914. „ Stebbing, Ann. S. Afr. Mus., vol. 15, part 1, p. 28.

GEN. PHILOCHERAS, Stebbing.

- 1862. *Cheraphilus* (part), Kinahan, Proc. Royal Irish Ac., vol. 8, pt. 1, p. 7.
- 1900. *Philocheras*, Stebbing, Marine Invest. S. Africa, Crustacea, pt. 1, pp. 48, 49.
- 1910. „ Kemp, Fisheries Ireland, 1908, pp. 135, 143.

The characters of this genus are very clearly explained by Mr. Kemp, and the species now to be described shows no disagreement with his exposition.

PHILOCHERAS MEGALOCHEIR, n. sp.

Plate LXXIX.

Of British and Irish species the present makes the nearest approach to *P. neglectus* (Sars), considered by Kemp to be only a variety of *P. bispinosus* (Hailstone and Westwood). It has only a single spine behind the rostrum, but it differs from the approximate species in having a much more broadly rounded rostrum, and still more in the great size of the hand and finger of the first peraeopods, to which

the specific name alludes. The finger is widely arched, and from its hinge the margin of the hand extends very obliquely to the widely projecting thumb, numerous setules lining the margin and resting on a membranaceous finely ribbed extension of the border. The small wrist has some little serrate spines at its inner corner, and a few of similar character are on the margin of the hand behind the thumb; otherwise these limbs are singularly devoid of any plumage, such as abundantly adorns the third maxillipeds and the much slighter second peraeopods. In the latter the hand is very insignificant, the feeble fingers much longer than the palm, which is not longer than its breadth. The telson is about three and a half times as long as its greatest breadth, tapering evenly almost to a point, but with a truncate apex just broad enough for a stout terminal spine, with a pair of much longer and more slender spines inserted in the margins just above it. The rami of the uropods are subequal in length to one another and to the telson, though from the manner of insertion the inner branch extends a little beyond the outer, and a little further still beyond the telson; the outer ramus is squarely truncate, its outer margin ending in a very small tooth on a level with the apical border.

The total length was 20 mm., of which the telson occupied 3 mm., a greater length than that of the sixth pleon segment.

Localities. Cove Rock NE. 2 miles; depth 25 fathoms (near East London). A 1317. And 33° 13' S., 27° 39' E.; depth 37 fathoms. A 1316.

FAMILY PALAEMONIDAE.

This family has been already considered in these Annals, vol. 6, part 1, p. 39, vol. 6, part 4, p. 383, and vol. 15, part 1, p. 30. In the first notice the new generic name *Macroteroecheir* is proposed in place of Ortmann's subgenus *Macrobrachium*; in the second (a General Catalogue of South African Crustacea) five genera of the family are noted, these being, besides that just named, *Palaemon*, *Eupalaemon*, *Parapalaemon*, and *Leander*, but the species there named *Leander squilla* (Linn.) should, I think, rather be called *L. affinis* (Milne Edwards), and the result of raising Ortmann's subgenus *Eupalaemon* to generic rank is to make that name a synonym of *Palaemon*, Fabricius, *sensu strictiore*. *Paluemon quoianus*, Milne-Edwards, can no longer stand under *Palaemon* thus limited, and perhaps belongs to *Leander*. The characters of *Palaemon* as restricted by Ortmann have been very fully set out by de Man in 1892 and Coutière in 1905.

GEN. PALAEMON, Fabricius, s.s.

1798. *Palaemon* (part), Fabricius, Suppl. Ent. Syst., pp. 378, 402.
 1891. *Eupalaemon* (subgenus), Ortman, Zool. Jahrb., vol. 5,
 pp. 696, 697.
 1892. " " de Man, in Max. Weber's Zool.
 Ergeb. Niederl. Ost.-Indien,
 vol. 2, p. 410.
 1902. " " de Man, Abhandl. Senck. Nat.
 Gesellsch., vol. 25, pt. 3, p. 763.
 1904. " " de Man, Trans. Linn. Soc. London,
 vol. 9, pt. 8, p. 291.
 1905. " " Coutière, Ann. Sci. Nat., Ser. 8,
 vol. 12, pp. 263, 273.
 1911. " " de Man, Notes from Leyden Mus.,
 vol. 33, p. 281.
 1912. " " de Man, Rev. Zool. Africaine,
 vol. 1, pt. 3, p. 413.
 1912. " " de Man, Ann. Soc. Zool. Belgique,
 vol. 46 (1911), p. 197.

PALAEMON SUNDAICUS, Heller.

(See these Annals, vol. 6, pt. 4, p. 384, 1910.)

The distinction of species in this family has been made largely to depend on the size, shape, and denticulation of the rostrum, the roughness or smoothness of the carapace and limbs, the relative proportions of various joints, details in the shape and armature of the chelae, and even on the position of small spines pertaining to the telson. Unfortunately for the systematist several of these characters are found to vary with the age or sex of individuals, and in some of these they may be obscured by wear and tear or by natural abnormality. While, therefore, it may be easy to say that such and such a species has been found in this or that locality, it may be a tedious business to confirm the statement.

The specimen here assigned to Heller's species is 100 mm. long, the carapace with the rostrum measuring 45 mm., and the telson 13 mm., equalling the length of the fifth and sixth pleon segments combined. The slightly imperfect rostral carina carries 10 or 11 dorsal teeth, much the longest interval being between the foremost 2 or 3 teeth and that next behind them; two of the teeth are behind the orbits; among the setules of the ventral margin 3 small teeth

could be felt. The carapace is very stout, with the hinder peraeopods contiguously paired beneath. The first peraeopods are very slender, with the wrist 14 mm. long, twice as long as the chela, the fingers of which are longer than the palm. The second peraeopods are both detached, one imperfect, but the remainder like its companion, these limbs being dark in colour, with none of the joints dilated, but the palm rather stouter than the wrist, that with the end unbroken measuring 126 mm. for the last 5 joints, composed as follows, beginning with the 3rd joint, 15, 24, 33, 54, 27 mm., the last of them, the finger, not adding to the length, as it closes accurately over the thumb which equals the palm in length and forms a very obtuse angle with it. The third, fourth, and fifth peraeopods are subequal, but the fifth rather the longest, all extending beyond the scale of the second antennae. The flagellum of these antennae attains a length of 153 mm., the longest flagellum of the first antennae (perhaps a little imperfect) measuring 118 mm. The uropods extend a little beyond the telson, and their exopod a little beyond the endopod.

Locality. Umlaas River, Natal; obtained by Dr. Gilchrist from salt water. A 1252.

PALAEEMON DELAGOA, n. sp.

Plate LXXX.

The present species may be regarded as a link between *P. macrobrachion*, Herklots, and *P. sollaudii*, de Man, 1912, on both of which the latter author has bestowed so much accurate attention. In the form here assumed to be new the rostral carina has 5 ventral teeth, 9 dorsal, of which 2 are behind the orbit, and the foremost 3 are rather widely spaced; the oblique apex is perhaps imperfect. The carapace with rostrum measures 34.5 mm., the telson 10 mm., the intermediate part about 35.5 mm., thus giving a total of 80 mm. The slender first peraeopod is 34 mm. long. The right-hand second peraeopod has a total length of 108 mm., the 3rd joint 14 mm., 4th 19 mm., 5th 35.5 mm., the 6th 39 mm. In the 6th the palm counts for 25 mm., the thumb for 14 mm., the finger being only 13 mm. does not quite reach the thumb's apex; both are furred on their opposed margins. The second peraeopod on the left is decidedly shorter than its companion, the thumb (perhaps slightly imperfect) not reaching beyond the finger. Both of these limbs can with difficulty be seen to carry lines of microscopic prickles. The peduncle of the first antennae does not reach the end of the scale of the second,

and that scale falls a little short of the rostral apex. The mandible has a slender three-jointed palp, a tridentate incisor plate and a prominent molar ending in a group of three strong teeth. The palp of the first maxillae is apically deeply bifid. The telson has a pair of dorsal spines at the middle, two pairs on the sides of the triangular apex, the outer pair very small, a group of feathered setae extending beyond the inner pair; microscopic prickles fringe the lateral margins, and perhaps extend over much of the surface. Of the intermediate pair of dorsal spines the left-hand spine could not be discerned.

Locality. Mouths of rivers flowing into Delagoa Bay yielded a single specimen, named after the bay. A 2196.

GEN. LEANDER, Desmarest.

(See the General Catalogue of South African Crustacea, 1910, in these Annals, vol. 6, p. 386, where for *Leander squilla* should, I now think, be read *Leander affinis* (Milne Edwards). See also Trans. R. Soc. Edinb., vol. 50, p. 286, 1914, and these Annals, vol. 15, p. 81.)

LEANDER PERINGUEYI, n. sp.

Plate LXXXI.

This species belongs to the section of the genus in which the palp of the mandible is three-jointed, in company with *L. serratus* (Pennant), *L. affinis* (Milne Edwards), *L. adspersus* (Rathke). But from all the congeneric forms with which I am acquainted it is distinguished by its peculiar rostrum. A small tooth on the carapace is followed at a well-marked interval by a series of 4 teeth, successively larger, the hindmost of them slightly behind the base of the eyestalk; to these again at an interval succeeds a series of 3 small teeth successively smaller, leading to a slightly upturned apex, broad in lateral aspect, its ventral margin receding to a broad cavity formed by a curved acute process at some distance to the rear, with no other ventral teeth except a microscopic spinule between the apex and the cavity. The telson is sharply carinate for half its length, twice as broad at its base as distally at the base of its little acute apical triangle, this base being furnished with a pair of long spines, between which are two rather longer setae, while they are flanked by a pair of much smaller spines. From the 2 pairs of dorsal spines normally to be expected, one spine of the upper pair is wanting in this specimen.

In the first antennae the second and third joints are subequal in

length, the first longer than both combined; the flagella, not absolutely perfect, show a length of about 40 mm. for the stouter, and about 30 mm. for the sligher, the small third flagellum which separates from the former, has a free course of about 22 joints, together equal in length to the first joint of the peduncle.

The incisor process of one mandible shows 4 teeth, that of the other only 3; the palp is very slender, the third joint longer than the first and second combined. The inner lobe of the apical plate or palp of the first maxillae is armed at the inner corner with a little spine which is twisted outwards, but this and various other details of the mouth-organs occur similarly in *L. affinis*. At the apex of the third maxilliped that species has a single strong spine, where the present specimen has two such spines, but the variation may be a casual one.

In the first peraeopods the fifth joint is nearly twice as long as the chela; in the second pair the fingers are about five-sixths the length of the palm.

The specimen, a female laden with eggs, had a total length of 66 mm., the carapace with rostrum accounting for 23 mm., and the telson for a little over 8 mm.

Locality. 33° 49' S. lat., 25° 56' E. long. A 1276.

The specific name is given as a mark of respect to Dr. Péringuey, Director of the South African Museum and Editor of these Annals.

LEANDER GILCHRISTI, n. sp.

Plate LXXXII.

This species differs, so far as I can find, from all other forms in the genus by having a good-sized distal tooth both on the dorsal and ventral margins of the rostrum, advanced nearly as far as the slightly upturned acute apex; there are in all 7 dorsal teeth, the hindmost situated on the carapace a little remote from the next, which is slightly behind the base of the orbit; the three anterior are a slightly larger group than the three behind, and correspond pretty precisely with the three ventral teeth. The telson is in very close agreement with that of *L. peringueyi*, but the apex is more abruptly narrowed, and the accompanying plumose setae are shorter instead of longer than the two long spines between which they extend. All four dorsal spines are present, but, as the figure shows, not symmetrically arranged, those on the left being wider apart than those on the right.

In the first antennae the teeth of the first joint are wider apart than in the other species, and the short flagellum separates from its companion sooner, the common portion showing only six instead of nine components; the companion (seemingly almost complete) is about four times as long.

The mouth-organs show no differences of any apparent importance, unless it be that the present specimen shows less expansion at the base of the exopod in the first maxillipeds and less flexure of the antepenultimate joint of the third pair.

In the first peraeopods the fourth and fifth joints are here rather shorter in relation to the third joint and the chela, and in the second peraeopods the fifth joint is here not longer than the palm of the chela.

The total length of the specimen, a female with eggs, was 57 mm.

Locality. East London wood, where, as long ago as April 4, 1900, it was taken by Dr. J. D. F. Gilchrist, after whom I have the pleasure of naming it.

GEN. PALAEMONETES, Heller.

- 1869. *Palaemonetes*, Heller, Zeitsch. wiss. Zool., vol. 19, p. 157.
- 1890. „ Ortmann, Zool. Jahrb., vol. 5, p. 513.
- 1904. „ Rathbun, Decap. Crust. N.W. coast of N. Amer.,
p. 30.
- 1906. „ Norman and Scott, Crust. Devon and Cornwall,
p. 20 (with synonymy).
- 1910. „ Kemp, Fisheries Ireland, 1908, pp. 127, 132.
- 1912. „ Rathbun, Bull. Mus. Comp. Zoöl, vol. 54,
p. 451.

In 1899 Borradaile instituted a genus *Palaemonopsis* for a specimen from New Britain, agreeing with *Palaemonetes* in the absence of a mandibular palp, but differing from it in having on each side of the carapace one antennal spine only. In these two respects the specimen about to be described agrees with *Palaemonopsis*, but differs so considerably from it in the first antennae and the second peraeopods that it cannot safely be assigned to that genus. On the other hand, with the first and third peraeopods missing, I am unwilling to found upon it another genus while the much-needed revision of the family Palaemonidae, to which Mr. Kemp has called attention, is still in abeyance.

PALAEMONETES NATALENSIS, n. sp.

Plate LXXXIII.

The dorsal teeth of the carapace are eleven in all, three behind the base of the orbit, followed by seven in close succession on the rostrum, but the two foremost more widely spaced than the rest, and finally a longer interval leading to a denticle just in advance of the apex; the three ventral teeth nearly correspond in position with the dorsal three behind the denticle. The sixth pleon segment is much longer than the fifth. The telson is nearly three and a half times as long as its greatest breadth, narrowing evenly to a shallowly triangular apex, the median point flanked by two small spines, outside of which is a much larger pair, with a very small pair at the corners similar to two lateral pairs, one about at the middle of the telson's length, the other intermediate between that and the apex.

In the first antennae the third joint is less than twice as long as broad, shorter than the second, both combined much shorter than the first, which has an apical tooth, the basal spine reaching little beyond the middle of the joint and scarcely beyond the globular cornea of the eye; the stouter flagellum with its longer branch is considerably longer than the peduncle; the shorter branch, which is also rather the stouter, is subequal in length to the part from which both branches spring, and combined with that part gives a length equal to the peduncle; the more slender independent flagellum equals in length the stouter in combination with its longer branch. The proportions of these flagella in *Palaemonetes varians* (Leach) and *Palaemonopsis willeyi*, Borradaile, differ markedly from those just described. The scale of the second antennae differs little from that of *P. varians*, the flagellum, which is incomplete, could scarcely have been the full length of the body.

The incisor process of the mandible has three unequal teeth. The palp of the first maxilla is apically bilobed, with a little upturned tooth or spinule on the inner lobe. In the second maxillae the *lacinia interna* is not produced into lobes, the median lobes are very slender, and the apical plate is unarmed. In the second maxillipeds the second and third joints are completely fused, the large sixth joint a little outflanks the large transversely attached and strongly fringed seventh. The antepenultimate joint of the third maxillipeds is long and curved, the exopod reaching nearly to its apex.

First pereopods unknown; the second have the fourth joint about as long as the first three combined, considerably longer than the

fifth joint or carpus, which in turn is a little longer than the slender chela; proportions, quite unlike those in the two species above compared; the fingers close tightly together and are subequal in length to the palm; there are several groups of setae on the fixed finger, and a group near the apex of the carpus. The fourth and fifth peraeopods are nearly alike, the long fourth and sixth joints subequal in length, but decidedly less than twice as long as the fifth joint without reckoning the little lobe by which that overlaps the sixth; the finger is very small and curved, about a tenth as long as the sixth joint. A little tooth precedes its upturned point, but this may be in preparation for the moult.

The first pleopod has a very short inner branch. The branches of the uropods are broad, the outer one a little the longer, much extended beyond the little apical tooth of the outer margin.

Total length 32 mm., carapace with rostrum 12.5 mm.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1275.

The specimen had a very uninviting appearance, as if covered in all directions by a sort of scurf. This, however, was easily removed, and eventually proved to consist chiefly of the ova of some Epi-caridian, together with the larvae in great numbers, minute objects considerably less in total length than half a millimeter, otherwise in close agreement with the figures given by Sars (Crustacea of Norway, vol. 2, pl. 94) for the male larvae of *Dajus mysidis* (Kröyer).

FAMILY ALPHEIDAE.

- 1888. *Alpheidae*, Bate, Rep. Voy. Challenger, vol. 24, p. 528.
- 1899. „ Coutière, Thèse à la Faculté des Sciences Paris
(with bibliography), Ann. Sci. Nat. Zool., Ser. 8,
vol. 9.
- 1899. „ Borradaile, Willey's Zool. Results, pt. 4, p. 415.
- 1901. „ Alcock, Indian Deep-sea Macrura, p. 139.
- 1905. „ Coutière, Fauna Maldive-Laccadive Archip., vol. 2,
pt. 4, p. 852.
- 1911. „ de Man, Siboga Exp., vol. 39a', p. 135 (Suppl.
Plates, 1913).
- 1913. „ Zimmer, Zool. Jahrb., Suppl. 11, pt. 3, p. 381.
- 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10,
Suppl. 2, p. 37.

Through the above-cited authorities numerous other references may be traced.

GEN. ALPHEUS, Fabricius.

1798. *Alpheus*, Fabricius, Suppl. Ent. Syst., pp. 380, 404.

Notice has been already taken of this genus in the General Catalogue, South African Crustacea, part 5, 1910. The literature discussing it is very extensive.

ALPHEUS NOTABILIS, n. sp.

Plates LXXXIV., LXXXV.

The interesting specimen here described, besides being solitary, was without flagellum to the second antennae, had only one member of the first pair of peraeopods, neither of the second pair, and only one representative for each of the three following pairs. All the limbs were detached, but as there was no other specimen in the bottle there can be no reasonable doubt that the limbs belonged to the body which they accompanied.

The rostrum protrudes from between the raised and distally rounded eye-lobes and its carina is continued along two-thirds of the carapace. The covered eyes are dark and sub-rotund. In the first antennae the second joint is nearly as long as the first and two and a half times as long as the third; the shorter flagellum has its thickened part about half as long as its slender companion, with a slender 12-jointed continuation equal to nearly a third of the preceding length; this is composed of 26 joints, only the last of them having a freely projecting tip, which carries two long sensory filaments, 19 pairs of filaments being distributed over 9 joints. The well-marked apical tooth of the bent and strongly plumose scale of the second antennae just reaches the apex of the plumose portion.

The incisor process of the mandible has one rather large tooth between three or four much smaller teeth above and five very minute ones below; the powerful molar is fringed with combs or brushes of hair-like teeth; the palp with seta-fringed second joint is bent as usual on to the inner surface of the mandible. The palp of the first maxillae has a bilobed apex, with a single spine on the tip of the inner lobe. The corresponding joint of the second maxillae is small with a spinule at the narrow apex and a few setae low down on the outer margin. In the slender terminal part of the endopod of the first maxilliped the jointing is obscure. In the second maxillipeds there is a very large branchial plate attached to the first joint, the second and third joints are completely coalesced, the part representing the third joint being distally expanded, the sixth is

strongly dilated above the fifth, and the transversely apposed seventh is strongly spined. The third maxillipeds have the antepenultimate joint long and twisted, the penultimate distally expanded beyond the insertion of the last joint; this inward expansion carries a group of straight setae extending beyond the last joint, which is more than twice the length of the penultimate and itself very copiously furnished with long setae.

The first peraeopod, which from its structure is no doubt the smaller cheliped of the present species, is remarkable alike for its setose furniture and the great length of the hand. The character naturally suggested a comparison with *Alpheus longimanus*, Bate (Rep. Voy. Challenger, p. 551, pl. 98, fig. 4), a species which I cannot find mentioned in Dr. de Man's admirable monograph of the family, nor indeed by any other authority since its publication. Bate declares that the second peraeopods have the "carpos six-articulate," which would be a very important feature, were not the importance discounted by the circumstance that his figure clearly shows the wrist normally five-jointed. In the first antennae he represents the shorter flagellum as much less than half the length of the other, and in the second antennae the long joint of the peduncle overtops the scale, whereas in our specimen it does not reach the top of it. In the smaller first peraeopod Bate describes the fingers as "nearly, and in some instances quite, as long as the propodos," meaning of course the palm. In our species the fingers are very considerably shorter than the palm, and the fringes of very long setae with which fingers and palm are alike begirt are exceedingly notable. The fourth joint on the outer edge is as long as the palm, and on the inner edge near the base shows four slender spines and is lightly fringed with setae. The third and rather shorter fourth peraeopods have each the sixth joint fringed with long setae; the more slender fifth has the distal half of the sixth joint's inner margin fringed with more than twenty little groups of setae, increasing in size as they approach the straight pointed finger.

The first pleopods have the inner ramus very short, both rami fringed with long setae. In the second pair the inner ramus is longer than the outer, with a long slender retinaculum. In both pairs the peduncle is elongate, with stout setae above and below on the inner margin for holding the ova. The uropods are very broad and strongly plumose, the outer ramus rather the longer, a diaeresis ending in a small tooth low down. The telson is peculiar in shape, narrowing a little above the middle, at five-sixths of the length each

lateral margin ending in a little tooth, the remaining sixth forming a half oval fringed with 14 pairs of long plumose setae.

The total length of the body was 30 mm., the carapace being 10 mm. long and the telson 5 mm.

Locality. Delagoa Bay, the specimen obtained by Mr. K. H. Barnard. A 2130.

ALPHEUS LOTTINI, Guérin.

1826-30. *Alpheus lottini*, Guérin, Voy. de La Coquille, Atlas, Crust., pl. 3, fig. 3.

1837. „ *ventrosus*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 352.

1837. *Alpheus lothini*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 353 footnote.

1838. *Alpheus lottinii*, Guérin Méneville, Voy. de La Coquille, Zool., vol. 2, pt. 2, p. 38.

1839. *Alpheus laevis*, Randall, J. Ac. Sci. Philad., vol. 8, p. 141.

1852. „ „ Dana, U.S. Expl. Exp., vol. 13, p. 556, pl. 35, fig. 8a-h.

1899. „ „ Coutière, Ann. Sci. Nat. Zool., Ser. 8, vol. 9, pp. 250, 262, figs. 307, 321, 325.

1905. *Alpheus ventrosus*, Coutière, Maldive-Laccadive Archip., vol. 2, pt. 4, p. 882.

1911. „ „ de Man, Siboga Exp., vol. 39a', pp. 311, 339.

Milne-Edwards says that "L'Alphée de Lottin dont il a été publié une bonne figure, mais dont la description n'a pas encore paru, paraît être très-voisine de l'espèce précédente," namely, his own *Alpheus ventrosus*. But the description of *A. ventrosus* does not seem to justify any claim for the priority of that name over Guérin's *A. lottini*. Bate's figure of *A. laevis* in the *Challenger* report cannot easily be reconciled with the species here in question.

Our specimen, a female with eggs in a forward state of development, was unfortunately bereft of both members of the first pair of peraeopods. The second pair were attached to the body, and by their comparative stoutness and the relative lengths of the five compartments of the wrist are in unmistakable agreement with the figures by Dana and Coutière. A similar agreement is shown by the broad blunt-ended fingers of the hinder peraeopods, a character so unlike that which is found in most members of the genus. In the uropods a strong dark spine is extended from within and beyond the

distal tooth of the outer margin of the outer ramus. The apical breadth of the telson is a fourth of its length, as measured between the distal points of the lateral margins, beyond which it extends in a shallow three-sided convexity, bordered with plumose setae two central spines and a small and large pair at the corners. Between the mouth-organs of this and the preceding species there are several small differences of detail.

Total length of specimen 22 mm., the carapace 7 mm., the telson 3 mm.

Locality. Delagoa Bay, where the specimen was obtained by Mr. K. H. Barnard. A 2123.

ALPHEUS DISSODONTONOTUS, n. sp.

Plate LXXXVI.

This striking species is closely allied to *Alpheus praedator*, de Man, 1908, and to *A. bidens* (Olivier), as recently described and figured by de Man, who finds a synonym of it in *A. tridentatus*, Zehntner (Revue Suisse Zool., vol. 2, p. 204, pl. 8, fig. 24, 1894). The remarkable feature of these rare forms is the presence of two strong teeth on the back of the carapace, not beside the rostral tooth, but well to the rear of it. To this feature the new specific name refers, in agreement with Olivier's *bidens*, while the addition of the rostral tooth would justify the epithet *tridentatus*. In the two earlier species the medio-dorsal carina is interrupted behind the dorsal teeth and resumed with an obtuse tubercle. In the new species this tubercle is not found, and the dorsal teeth are separated from the carina by a very narrow groove. The most obvious further distinction is in the second peraeopods, in which the first carpal joint is decidedly longer than the second, instead of shorter as in the other two species. The telson is just twice as long as its greatest breadth at the base; the apical curve is closely fringed with 24 strongly plumose setae and numerous short spines, with a very small pair at the outer corners and a rather larger pair just within this small pair. The upper dorsal pair of spines is a little above, and the lower pair a little below the middle of the telson.

The globular eyes are clearly visible beneath the inflated hoods; as to the latter de Man says that in *A. praedator* "the eye-hoods end anteriorly in an obtuse tubercle"; in the present species it is the eyes themselves that show a small tubercle which seems to project clear of the hoods. The first antennae have a broad stylocerite, the

sharp apex of which reaches the end of the first joint, the second is shorter than the first but considerably longer than the third joint; the stouter flagellum consists of 17 thick joints followed by 10 that are thinner; the other flagellum is more than thrice as long. In the second antennae the tooth of the scale reaches only a little beyond the setose portion of the blade, which slightly overtops the peduncle.

The incisor process of the mandible is broad, convex, its middle tooth the largest, the rest successively smaller in each direction. The first maxilla has the palp bifid, with a single spine at the apex of its inner lobe. The second maxilla has the palp weak, with a spine on its narrow apex, and the adjoining plate (*lacinia media*) appears to be completely undivided. The short, transversely articulated, finger of the second maxilliped is of notable breadth. The antepenultimate joint of the third maxilliped is strongly curved, thus differing from the straight form of that joint as figured by de Man for *A. praedator*, but the difference may be referable to the much smaller size of the specimen by which that species is represented; in both species the terminal joint carries very long setae; in the present the little epipods of these maxillipeds have hook-shaped apices as shown in the figure, and the same character may be noticed in the second peraeopods.

The relative dimensions of the large left and the much smaller right cheliped of the first pair may be judged from the figures, the left hand being about 19 mm. and the right about 12 mm. long. Notwithstanding the great difference in the bulk of the hands, the fourth joint is about the same for each limb, and has in each a sharp ridge ending in a conspicuous tooth. In the second peraeopods the first jointlet of the wrist is equal to the last three combined and decidedly longer than the chela, the fifth is longer than the third or fourth but not equal to both combined; the second jointlet is equal to the chela, in which the fingers are somewhat longer than the palm. In the third and fourth peraeopods the fourth joint has the inner margin produced into a prominent subapical tooth; in the third pair there are seven spines along the inner margin of the sixth joint; in the fourth pair only six spines in this position. The fifth pair is more slender, its fourth joint without the sub-apical tooth, its fifth joint rather longer than in the other two pairs. In all the fingers are simple.

The uropods are of great breadth, strongly fringed with plumose setae, the diaeresis of the outer ramus not strongly sinuous.

The total length of the specimen, a female with globular ova,

measured round the back was 44 mm., the carapace being 13.5 mm., the telson 6 mm. long.

Locality. 33° 50' S., 25° 46' E. ; depth 20 fathoms. A 1561.

GEN. SYNALPHEUS, Bate.

1888. *Synalpheus*, Bate, Rep. Voy. Challenger, vol. 24, pp. 480, 572.
 1899. „ Coutière, Ann. Sci. Nat. Zool., Ser. 8, vol. 9,
 pp. 154, 334, etc.
 1905. „ Coutière, Fauna Maldive-Laccadive Archip.,
 vol. 2, pt. 4, pp. 853, 869.
 1909. „ Coutière, Pr. U.S. Mus., vol. 36, pp. 1-93.
 1911. „ de Man, Siboga Exp., vol. 39a, p. 185.
 1913. „ Zimmer, Zool. Jahrb., Suppl. 11, pt. 3, p. 381.

In Bate's original definition of the genus a salient point is the statement that the mandibles have a curved, sharply pointed, and almost rudimentary incisor process, with a small two-jointed palp. But Professor Coutière in 1899 explains that, while this is true for the single species on which Bate founded his genus, there are gradations which lead through closely allied species from this form of mandible to that which may be regarded as normal in this genus and *Alpheus*. Authors may well be excused for not foreseeing discoveries of this kind, since in the process of evolution every peculiarity, however striking, is liable to be neutralized in the same way for purposes of classification. A new and full description of the generic character is given by Coutière in 1899. As often happens, some of the features are shared with neighbouring genera, and some of the distinguishing points, besides the incisor of the mandibles, are alternative. Since 1888 there has been an amazing development of the genus, for in place of the single species then assigned to it by Bate, de Man in 1911 enumerated 62 species and 15 varieties from the Indo-Pacific region alone. In the discrimination of these species minute measurement plays an almost alarming part, because as the eyes are completely covered by the carapace the vision of these creatures must be dim, and without compasses the members of different species will never know one another apart. Perhaps indeed the numerous varieties may be the result of inconsiderate intermarriages.

In 1909 Coutière distributed the species then known among six groups, with keys which must be invaluable to those who

have varied material available for study. The *Comatularum* group is distinguished from the rest by having "supraorbital spines insignificant compared to the rostrum," while the others have these spines "at least equal to the rostrum in importance." Our South African species does not conform to either condition, but neither does Coutière's own, *S. paraneomeris*, 1905, since there the variable rostrum is described as always more or less, though not very considerably, longer than the supraorbital spines.

SYNALPHEUS ANISOCHEIR, n. sp.

Plate LXXXVII.

Rostrum twice as long as breadth at the base, supraorbital spine not reaching the level of the rostral apex. Telson at base twice as broad as the interval between its postero-lateral teeth; between these the margin is produced to rather less than a semicircle, fringed with (about 30) plumose setae, a notch at each corner containing a small and a larger spine, the dorsal spines wide apart, the anterior pair not quite symmetrically placed, but in line with the lateral teeth the left-hand spine is slightly above, the right-hand slightly below the middle.

Peduncle of first antenna with spine of first joint longer, but the trunk rather shorter than second and third joints combined; the shorter flagellum with the stouter portion 10-jointed, as long as the peduncle, the last five joints carrying sensory filaments, the terminal point free, the slender continuation showing 6 joints, but imperfect; the slender flagellum is more than twice the length of the stout portion of its companion. In the second antennae the long joint or carpus of the peduncle reaches a little beyond the end of the long spine of the scale, this tooth reaching well beyond the blade of the scale and remaining free from it to below the middle; the blade itself is apically rounded and fringed with setae round the apex and inner margin, the remaining portion of the flagellum is 18-jointed, as long as the peduncle, and by its stoutness rather suggesting a length exceeding that of the first antennae. Coutière assigns to the *Comatularum* group "antennules shorter than the antennae," but to the other groups "antennules at least equal to the antennae." I am forced to join the conspiracy of silence which in the description of species seems invariably to leave this part of the organism indeterminate.

The incisor process of the mandible has seven well-pronounced but unequal teeth. The palp of the first maxilla is bilobed, with a single spine on the apex of the shorter inner lobe. The last joint of the third maxillipeds has some strong spines on the obliquely truncate apex, one surface thickly set with rows of spines, the preceding joint very short.

The asymmetry of the first pair of peraeopods is characteristic of the genus, but in this species, besides the usual diversity of form, the inequality of size in the hands, alluded to by the specific name, seems to be carried to an extreme. While the smaller chela is 3.5 mm. long by 1.3 mm. broad, the larger is 8.5 mm. long by 3.5 mm. broad, with a corresponding difference in thickness. Notwithstanding this great difference in the bulk of the hands the three preceding joints differ but little in size in the pair. In the second peraeopods the first jointlet of the carpus is rather shorter than the four following combined, the second, third, and fourth each little longer than broad, combined rather longer than the fifth, which equals the palm of the chela and is slightly shorter than the fingers; the fixed finger has several tufts of stiff setae. The fingers of the fourth and fifth peraeopods are strongly curved at the pointed apex, within which is a short tooth. The sixth joint of the fourth pair has 6 spines along the inner margin, which in the fifth pair carries numerous tufts of spinules. The rami of the pleopods are broad, and much more so those of the uropods, the outer of which is prolonged considerably beyond the tooth of its outer margin; between this and a longer inner tooth are planted two conspicuous spines; from the inner tooth starts the very sinuous diaeresis. Besides the extensive marginal fringes of plumose setae, the inner ramus down the centre of its ventral surface has numerous rows of spines. The ova are large, 2 mm. long, showing the eyes, but have become hardened. The total length of the mother was 18 mm., the carapace 7 mm. long, and the telson 2.5 mm.

Locality. Gordon's Bay, False Bay, whence it was obtained by Dr. Gilchrist more than ten years ago. A 1555.

GEN. ATHANAS, Leach.

1814. *Athanas*, Leach, Edinb. Encycl., vol. 7, p. 432.

1817. ,, Leach, Malac. Podophth. Britanniae, text to pl. 44,
 No. 14.

1863. ,, Heller, Crust. südlichen Europa, p. 280.

1898. ,, Borradaile, Pr. Zool. Soc. London, p. 1011.

1899. *Athanas*, Coutière, Ann. Sci. Nat., Thèse "Alpheidae," passim.
 1905. „ Coutière, Fauna Maldive-Laccadive Archip., vol. 2,
 pt. 4, p. 856.
 1908. „ Coutière, Bull. Soc. Philomathique, n. Ser., vol. 11,
 No. 5, p. 2.
 1911. „ de Man, Siboga Exp., vol. 39a', p. 144.

ATHANAS, sp.

The specimen, an ovigerous female, was in a fragmentary condition, having none of its peraeopods except one member of the second pair, and the flagella of both pairs of antennae imperfect. Hence its systematic position cannot well be determined. The carapace agrees with *A. nitescens*, but the first joint of the first antennae is little longer than the second, the eleven remaining joints of its flagellum show no sign of a division, and the stylocerite springs nearly from the base of the peduncle and overlaps the base of its third joint. The scale of the second antennae is very broad, the tooth of the straight margin not reaching beyond the broadly convex distal margin. In each mandible the excisor process has 12 teeth, 6 large and 6 small, more or less regularly graduated from each corner in a broad curve; the second joint of the palp is fringed round the distal half or rather more with long setae. In the second maxillipeds the second and third joints are coalesced, the fifth joint is short, having the tongue-like process of the sixth bent against and beyond it, carrying as it were in transverse attachment the spinose finger, a broad short strip.

The second peraeopod has the third and fourth joints subequal in length, the first division of the wrist nearly as long as the other four combined, the second and third scarcely shorter than the fourth, and these three combined scarcely longer than the fifth; the chela is as long as the three preceding divisions of the wrist combined, the finger as long as the palm.

The branches of the uropods are not quite so broad as the telson, the inner subequal to it in length, the outer a little longer, with the part following the diaeresis broader than long. The broad convex distal margin of the telson has markings indicative of 14 pairs of setae within the pair of teeth and attendant spines at the corners; there are two pairs of dorsal spines not far from the smooth slightly converging lateral margins, the upper pair a little above, the lower a little below, the middle of the telson.

Total length 15 mm., the telson 2.5 mm.

Locality. False Bay, St. James (taken by Dr. Gilchrist).
 A 1296.

FAMILY HIPPOLYTIDAE.

1910. *Hippolytidae*, Stebbing, Ann. S. African Mus., vol. 6, pt. 4
p. 390 (with synonymy).
1912. „ M. J. Rathbun, Bull. Mus. Comp. Zool., vol. 54,
p. 454.
1914. „ Kemp, Records Indian Mus., vol. 10, pt. 2,
p. 81.
1914. „ Stebbing, Ann. S. African Mus., vol. 15, pt. 1,
p. 34.

Miss Rathbun adds a new genus *Barbouria*. Mr. Kemp adds two new genera, *Gelastocaris* and *Merquía*, and supplies a valuable key to 15 Indo-Pacific genera of the family.

GEN. HIPPOLYTE, Leach.

1814. *Hippolyte*, Leach, Edinb. Encycl., vol. 7, p. 431.

HIPPOLYTE KRAUSSIANUS (Stimpson).

1860. *Virbius kraussianus*, Stimpson, Pr. Ac. Sci. Philad., p. 105 (36).
1910. *Hippolyte kraussiana*, Stebbing, Ann. S. African Mus., vol. 6,
pt. 4, p. 391.

Three specimens in good agreement with Stimpson's description have been obtained by the *Pieter Faure*. One of them 29 mm. long considerably exceeds the size mentioned by Stimpson, and the rostrum much exceeds the length of the peduncle of the first antennae, though not reaching the apex of the scale of the second, and otherwise conforming to Stimpson's account, "above at the base bidentate, at the apex tridentate, on the lower margin quadridentate." A second specimen, a female, ovigerous, 18 mm. long, practically agreeing in this respect with Stimpson's, has, like his, the rostrum little longer than the peduncle of the first antennae, with the dentation numerically the same, except for the addition of a minute ventral tooth. This, however, does not exclude a different arrangement of the teeth in our two specimens, the ventral teeth in the larger being much more remote from the apex than in the smaller, and its median apical tooth being advanced beyond its smaller neighbours above and below, whereas in the smaller specimen the lowest tooth of the three is the largest and the most advanced. In the third specimen,

only 13 mm. long, and very insignificant in bulk compared with the first, the rostrum again is little longer than peduncle of the first antennae, but it has only one ventral tooth in addition to that of the apical trio, both the other members of which reach beyond it, the median tooth greatly exceeding both its partners. In the smaller specimens the flagella of the first antennae might justify Stimpson's characterization of them as subequal, but in the largest specimen the more slender flagellum is considerably the longer. The flagellum of the second antennae appears to be as long as the body; the scale is broad, the apical tooth of the outer margin not nearly reaching the end of the broadly rounded setose distal border.

The mandibles have a strong molar, the incisor process weak, ending in five little teeth. First maxillae with a short twisted palp. Second maxillae with lowest lobe receding, fringed with a few long setae, apical plate bent, tipped with one spine. First maxillipeds with the slender distal part of the endopod rising from a broad membranaceous base. Finger of second maxillipeds short, broad, with fan-like fringe of slender spines.

First pereopods short, stout, fingers shorter, wrist rather longer than palm and subequal to the fourth joint. Second pereopods, with wrist subequal to fourth joint, its proximal division as long as the other two combined, the third longer than the second. Fifth pereopods having the finger fringed with 8 graduated spines, the largest adjoining the unguis, which is backed by a spine slightly longer and more slender.

Postero-lateral angles of the sixth pleon segment acute. Outer ramus of the uropods broad, its outer margin smooth, ending in a small tooth, within which is a large spine, the distal border of the ramus extending some way further, fringed with setae. The elongate telson has two pairs of dorso-lateral spines, as stated by Stimpson, but also three pairs of different sizes on the apex.

Localities. Knysna $\frac{1}{4}$ mile above jetty. A 1282. A specimen, ovigerous female, from East London, sent to the Museum by Mr. Wood, agrees with the largest of the three specimens described above exactly in the rostral character, and has a total length of 32 mm. A 1281.

GEN. SPIRONTOCARIS, Bate.

1888. *Spirontocaris*, Bate, Rep. Voy. Challenger, vol 24, pp. x, 576, 595.
 1898. „ Walker, Tr. Liverpool Biol. Soc., vol. 12, p. 276.
 1904. „ Rathbun, Decap. Crust. NW. Coast N. America, pp. 5, 56-107.
 1906. „ Norman and Scott, Crustacea of Devon and Cornwall, p. 18.
 1906. „ Calman, Ann. Nat. Hist., Ser. 7, vol. 17, pp. 31, 32.
 1910. „ Kemp, Fisheries Ireland, 1908, i., pp. 99, 102.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10, Suppl. 2, p. 42.

Through the above references there may be traced a large literature relating to this rather perplexing genus. The species now offered as an additional member of its numerous horde does not conform with the original definition, as it is devoid of the two supraorbital teeth therein mentioned, its rostrum is not deep, and the incisor process of the mandible cannot be called rudimentary. One or other or both of the first two deficiencies, however, it shares with several other species, and with regard to the third precise information is in most cases wanting. The mouth-organs are suggestive of agreement with Bate's *Hetairus*, but if that genus were resumed from the synonymy of *Spirontocaris*, Bate's statement that the third maxillipeds are without an exopod must be noted as erroneous.

SPIRONTOCARIS PAX, n. sp.

Plate LXXXVIII.

The species to which the present appears to make the nearest approach is *Spirontocaris cranchii* (Leach), 1817, which in turn closely resembles the rare form from Japan named *Hippolyte gracilirostris* by Stimpson in 1860, and transferred to *Spirontocaris* by Balss in 1814. Here the slender rostrum carries dorsally 4 teeth instead of 6 as in Stimpson's species, a smooth space being left anteriorly which his occupies with the 2 foremost teeth; ventrally there are 2 small teeth just behind the apical point in Balss's figure of the other species. In *S. cranchii* the 3 or 4 rostral teeth approach the bifid or trifid apex more nearly than here. In all

three species there is no other tooth, except the antennal. The third segment of the pleon is medio-dorsally produced over the fourth, but not acutely. The sixth segment is much longer than any of the preceding segments. The apical margin of the telson carries a pair of long spines, between which are 3 rather more than half as long and several setae; above them are a small pair of spines and outside them a rather short pair, above which on the left are a series of 6 spaced sub-lateral spines, while on the right, no doubt abnormally, there are only 3 spines, unsymmetrical in position. Stimpson gives the telson of his species 4 pairs of dorsal spines, and the same number is assigned to *S. cranchii* by Milne Edwards and Bell. Eyes dark, cornea globular. First antennae agreeing with Bate's account of those appendages in "*Hetairus gaimardii* (Milne-Edwards)." Second antennae nearly as long as the body, the tooth of the scale almost level with the rounded apical margin.

Mandibles with much denticulate molar, which is much stouter than the incisor process, the latter ending in an obliquely truncate apex, the anterior point of which is finely bifid, and the receding border cut into 6 or 7 little teeth; the two-jointed palp is rather feeble, the second joint carrying a few setae. The first maxilla has several strong spines about the curved apex of the lower plate, a close fringe of spines round much of the margin of the large median plate, and the palp proximally stout, with two unequal spines on the faintly emarginate much narrower apex. The second maxilla has the lower plate apparently undivided, carrying a curved series of some 10 long not very closely-set setae, the middle plate divided about to the middle, both lobes fringed with close-set setae or spines, the palp or apical plate not very broad, but the apical part rather abruptly narrowed, tipped with 2 very unequal spines, neither very large. The first maxilliped differs from that described and figured by Bate for *Hetairus gaimardii* (Milne Edwards), chiefly in the apical part of the endopod, which Bate speaks of as "a two-jointed continuation," the figure showing the two joints about equal in length. In our species the widest part at the base is short, followed by a narrower but much longer portion, to which succeeds a still narrower but quite short apical piece. I cannot definitely make out any articulation between these three divisions, though I cannot positively deny its existence between the last two compartments; the broad proximal part of the exopod has a distal fringe of long setae, not short ones as in Bate's figure. The second maxillipeds are in near agreement with the figure given by Bate. The

third maxillipeds have a small exopod, not nearly so long as the antepenultimate joint of the endopod; but this is not a point of distinction from "*Hetairus gaimardii*," since that also, as I stated in 1893, has the exopod in question, the species properly belonging to *Spirontocaris*.

The first peraeopods are moderately robust, the chela nearly as long as the fourth joint, not twice as long as the fifth joint, in this respect differing from *S. herdmani*, A. O. Walker, 1898; the fingers are rather less than two-thirds the length of the palm. The second peraeopods are slender, the divisions of the wrists not exactly corresponding in the pair of limbs, but the proximal first and second jointlets in both are coalesced, so that the wrist is 6-jointed. Here, however, the result is due to the coalescence mentioned, whereas in *S. cranchii*, according to Mr. Kemp's fig. 8, pl. 18, there is a jointlet missing. Stimpson speaks of the third, fourth, and fifth peraeopods in his species as all slender, which is an epithet not applicable to the third pair in the new species, and not specially appropriate to the fourth or fifth. Walker mentions that the third peraeopods in *S. herdmani* have 3 spines on the distal third of the fourth joint. In the new species no such spines were observable. In all three pairs the fifth joint is distally produced over the base of the long sixth, and the short stout finger is fringed with spines on the inner margin, and ends in a short stout unguis with a spine behind it.

The first pleopods are comparatively short, the second and third much longer, the long second joint being expanded, at first gradually, into a membranaceous wing which aids in securing the very numerous eggs; far down on the inner ramus there is a long coupling process with about a dozen minute hooks on the transverse apex. The uropods, which are rather longer than the telson, have the peduncle produced into a sharp point on its outer margin; the inner ramus, a very elongate oval, is a little shorter and narrower than the outer, which, besides the ordinary long plumose setae of its inner and rounded apical border, has the straight outer margin fringed all along with short setae to the distal tooth, this tooth not nearly reaching the apex.

Total length of the specimen, a female laden with eggs, was 14.5 mm., the carapace with rostrum being 4 mm. long, and the pleon to end of telson 10.5 mm.

Localities. 34° 11' S., 18° 31' E.; depth 20 fathoms. A 1297. And off Buffels Bay (False Bay); 30 fathoms. No. 116. The

specimen from this locality has on the rostrum 5 dorsal teeth and 3 very small ventral teeth.

With all Europe in the throes of war (August 17, 1914), this little species is a fitting representative of Peace, in honour and hope of which I name it.

GEN. EXHIPPOLYSMATA, nov.

1914. *Hippolysmata* (part), Kemp, Records of the Indian Museum, vol. 10, pt. 2, p. 112.

Closely allied to *Lysmata*, Risso, and *Hippolysmata*, Stimpson. Rostrum longer, usually much longer than carapace, with an elevated dentate basal crest; telson lanceolate, the acute apex unarmed. Upper flagellum of first antennae elongate, its basal portion apparently composed of two coalesced branches, the shorter free only at the apex. Mandibles without palp, the molar comprising a broad spinuliferous band and by its side a projecting dentate plate. In the first maxillipeds the endopod has a small conical joint at the apex tipped with a spinule, the preceding joint a little wider and about two and a half times as long.

Mr. Stanley Kemp has recently (April, 1914) given a key to the Indian species of *Hippolysmata*, separating a new species, *H. ensirostris*, with a variety *punctata*, from the rest by characters of which I have made use for instituting the present genus. The Indian species is said to be very variable in some of its features, so that it may be a question of taste whether nearly related forms shall be treated as named varieties or as distinct species.

EXHIPPOLYSMATA TUGELAE, n. sp.

Plate LXXXIX.

The dorsal crest is composed of 13 graduated teeth increasing in size towards the front, with a small tooth at a little distance on the carapace to the rear and another at a small distance on the rostrum in front; just behind the latter tooth begins a row of 7 ventral teeth, at first at small then at large intervals, while above all but the first the dorsal margin is perfectly smooth. The rostrum, measured from the base of the eye-stalk is once and a half as long as the rest of the carapace; the antennal tooth and the antero-lateral are acute and pronounced. The telson is very like that of *E. ensi-*

rostris, but has the margins feathered with setae for nearly two-thirds of the length from the apex; the latter is acute and appears to have a very small pair of spines at its base, the main body of the telson has two pairs of dorsal spines, not quite symmetrically placed in the specimen figured.

The eyes are cylindrical, with a rather small corneal area.

The first joint of the first antennae has a tooth at about the middle of one margin; the much shorter second joint is decidedly longer than the third; the flagella are about as long as the body and sub-equal in length, the upper one at the base being considerably the broader, a thicker part indicative of 28 jointlets being accompanied by a thinner part, about half its width, which carries some 56 groups of filaments, only the rounded apex of this portion being free. The division into jointlets along this apparently composite part of one flagellum and along the corresponding portion of the other depends rather on marginal constrictions than on any definite articulation. The second antennae have a flagellum considerably longer than the body, the rounded apex of the scale reaching well beyond the strong tooth of the outer margin.

The character of the mandibles has been in part explained above. The part which may perhaps function as an incisor process extends in one mandible all across the end of the molar in three large teeth, the largest fringed with setules; in the other the extent is smaller and the edge divided into five teeth of various sizes, the setaliferous band of the molar being here accompanied by an irregular strip of three blunt teeth.

The lower lip shows two broad lobes with rather irregular outlines. The first maxilla has a bilobed apex, the inner lobe the larger with one long spine among others that are seta-like. The second maxilla has its vibratory plate more flat-topped than usual. The third maxilliped ends in a strong apical spine, the exopod extends along two-thirds of the antepenultimate joint, and a small epipodal plate is setiferous on its anterior margin.

The first pereopods are short, the fifth joint rather shorter than the fourth or sixth, the movable finger as in *E. ensirostris* scarcely two-thirds the length of the palm. The more slender but longer second pereopods have the wrist in each limb divided into 12 jointlets, of which the first is the longest, the last being next in size sub-equal to the palm but longer than the fingers; the fourth joint is very faintly sub-divided into 4 compartments and equals in length the first 8 of the wrist; it is rather longer than the somewhat stouter third joint, which is distinguished by a peculiar armament of 6 or 7 hooked

spines on its inner margin; it has other simple spines, but these are less strongly developed than those on the corresponding joint of the next two pairs. The third, fourth, and fifth peraeopods are stouter than the second, subequal to one another in length and similar in general appearance, but with certain differences, the fourth joint being successively shorter but the fifth successively longer; the fifth also near the end of its inner margin has four groups of serrate spines which are not represented on the two preceding pairs; in all three the finger has a group of spinules at the base of its acute unguis, and on the proximal part of the inner margin 3 spines successively larger; on the third and fourth pairs these are preceded by a very small spine, which in the fifth is perhaps hidden by the last serrate group.

In the uropods the broadly rounded apex of the exopod extends a little beyond the narrowly rounded apex of the endopod and much beyond the bifid, spine-including apex of the outer margin, from which the diaeresis starts its devious course.

The total length of the specimen was 67 mm., the carapace with rostrum 30 mm., the telson 9 mm., the flagellum of the second antennae about 85 mm.

Locality. Off South Head, Tugela River, from a depth of 12 fathoms. A 1274.

Another specimen was obtained at Cape Henderson, NW. $2\frac{1}{2}$ miles, from a depth of 26 fathoms. A 1203.

FAMILY OPHLOPHORIDAE.

(See Annals of S. African Museum, vol. 6, part 4, p. 394, 1910.)

GEN. ACANTHEPHYRA, A. Milne-Edwards.

(See Annals of S. African Museum, vol. 6, part 4, p. 394, 1910.)

ACANTHEPHYRA PURPUREUS, A. Milne-Edwards.

1906. *Acantheephyra purpurea*, Kemp, Fisheries Ireland, 1905, i., p. 4, pl. 1, pl. 2, figs. 1-3.

Mr. Stanley Kemp has discussed this species so fully, with the long list of synonyms which he assigns to it, that there seems to be nothing left to say on the subject. Our small South African specimen agrees with Bate's *A. sica* in the long straight rostrum with 10 dorsal teeth of which the foremost is

rudimentary and the three to the rear are behind the 5 ventral teeth which cover the same space as 6 of the dorsal. Each of the pleon segments from the third to the sixth is extended about equally in the medio-dorsal line over the segment behind it; the sixth is as long as the telson. The latter on its narrow distal half has 4 pairs of spines, and on the narrow apex 3 small and 2 moderately large spines. Bate's much larger specimen of *A. sica* has 9 or 10 pairs of dorso-lateral spines on the telson, and the scale of the second antennae, according to Kemp as well as Bate, is regularly narrowed to a sharp point armed with an apical spine. In the present specimen the apical spine is distinct enough, but it overtops an apical border which is almost straightly truncate and broad enough to carry 9 little slightly overlapping lobes. Unfortunately all the setae are missing from this appendage. The mandibular palp is described and figured by Bate as two-jointed, but it appears to be undoubtedly three-jointed, as figured by S. I. Smith in 1882; the first joint and the setose third being each shorter than the second. The specimen had only two of its peraeopods remaining, a first and a fifth, the latter almost devoid of setae, but this bareness might be accidental. Length 46 mm., carapace 15 mm., of which the rostrum accounted for 7 mm. The telson was 6.5 mm. in length, the scale of the second antennae 6 mm. The outer branch of the uropods is considerably longer than the inner, the tooth of its outer margin at some distance from the rounded apex.

Locality. Cape Point NE. by E. $\frac{1}{4}$ E. 40 miles; 800 to 900 fathoms. A 1273.

ACANTHEPHYRA BRACHYTELSONIS, Bate.

1888. *Acanthephyra brachytelsonis*, Bate, Rep. Voy. Challenger, vol. 24, p. 753, pl. 126, figs. 7, 7a.
 1891. „ „ Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 7, p. 195.
 1892. „ „ (? = *A. angusta*, Bate, and *A. erimia*, Smith), Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 9, p. 362, fig. 4.

1901. *Acanthephyra eximia*, var. *brachytelsonis*, Alcock, Catal
Indian Deep-sea Macrura, p. 78,
(as *A. brachytelsonis*) Illustr. In-
vestigator, Crust., pl. 3, fig. 2.
1906. ,, ,, var. *brachytelsonis*, Kemp, Fisheries
Ireland, 1905, pp. 21, 23.
1914. ,, ,, var. *brachytelsonis*, Balss, Abhandl.
K. Bayer Ak. Wiss., vol. 10,
Suppl. 2, p. 21 (distribution).

A South African specimen, with damaged antennae and the body broken in two between the fourth and fifth segments of the pleon, has the rostrum "armed on the upper surface near the base with six small teeth, from which point it is smooth to the apex, the lower margin has one tooth about one-third its length from the apex, and two near together about one-third from the base of the rostrum," in these respects exactly corresponding with Bate's description and also with his illustration, which differs very considerably from that supplied for *A. eximius* by the trustworthy pencil of Professor S. I. Smith (Rep. Comm. Fish. for 1885, pl. 14, fig. 1, 1886). No doubt, however, there are many connecting links between the two forms. According to Bate his *A. angustus*, which Kemp identifies with *A. eximius*, has the pleon carinate from the second to the sixth segment, and Alcock ascribes the same character to *A. eximius*. In the form here considered the first segment is also carinate. The various descriptions agree in giving the length of the telson as less than that of the exopod of the uropods, but it is not on that account especially short as might be expected from the name *brachytelsonis*. Its narrow apex is armed with a central tooth flanked by a pair of spines that are longer and stouter, with a slender pair intervening from below; there are four dorso-lateral spines on the right and three on the left of the distal half of the telson.

The scale of the second antennae, though narrowing from the base, is not very narrow at the apex, which is just overtopped by the marginal tooth. The mandibles have a broad incisor process divided into 8 or 9 teeth of different sizes, the most prominent one more or less central. This process is attached to the molar, which in the left mandible, as seen from the upper or inner surface, appears partially to fold over it. The palp of the first maxillae has two small spines projecting from the inner surface near the apex, and on the

outer margin of the base there is a row of 7 or 8 spinulate setae. In the second maxillae the proximal lobe is far less prominent than the following deeply bifid lobe except in respect of the very long setae with which it is fringed; the top of the vibratory plate is flattened. In the first maxillipeds the apical joint is much shorter than the preceding, and is overtopped by the long and broad exopodal plate. In the second maxillipeds the second and third joints are coalesced though their limits are defined, the exopod reaches much beyond the down-bent sixth joint to which the triangular finger is obliquely attached. In the third maxillipeds the antepenultimate joint is notable for the strong flexure of the proximal half and the great widening of the distal.

The total length of the specimen was about 84 mm., the carapace measuring 30 mm., of which the rostrum occupied 14 mm. The first and second segments of the pleon were together 12.5 mm. long, equal to the third segment, including its extended postero-dorsal tooth; the three following segments together measured 23 mm., and the telson 12 mm. In adding the lengths of the different parts, allowance must be made for the overlapping, the process of the third pleon segment extending over nearly half of the short fourth segment. Each of the three following segments has a dorsal tooth, the last the longest, but none of them very important. Plates illustrating this and the next species are reserved for future publication.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1210.

FAMILY NEMATOCARCINIDAE.

(See these Annals, vol. 15, part 1, p. 43, 1914.)

GEN. NEMATOCARCINUS, A. Milne-Edwards.

(See these Annals, vol. 15, part 1, p. 43, 1914.)

NEMATOCARCINUS PARVIDENTATUS, Bate.

1888. *Nematocarcinus parvidentatus*, Bate, Rep. Voy. Challenger, vol. 24, pp. lxxviii, lxxxvii, 214, 322, pl. 132.

The specimen here accepted as representing Bate's Japanese species above named makes as near an approach to his partial

figure and brief description as any that I have had an opportunity of examining. Bate could not describe the peraeopods, and on our specimen there were none to describe. The dorsal teeth on the carapace and rostrum number 27, and there is a little ventral tooth near the apex, just below the foremost of the dorsal teeth. Bate says "the frontal margin has a well-developed antennal tooth, but the fronto-lateral tooth appears to be entirely absent." If by "fronto-lateral" he means the tooth at the lower front corner, which I call the antero-lateral, it is well marked in his figure and is found in the South African specimen. The telson is narrow, and has only 4 pairs of dorso-lateral spines, two of the pairs in unsymmetrical arrangement; the spines of the apex are for the most part missing. The eyes are moderately large, dark red. The stylocerite of the first antennae is broad, ending acutely, not nearly reaching the apex of the first joint. In the second antennae the setose distal border is broad, slightly convex, on a level with the little apical tooth, the flagellum about 75 mm. long. The mandible has a broad incisor process edged with six unequal teeth, the molar stout, the third joint of the palp much the longest and broadest, with a fringe of long setae. The palp of the first maxilla is slightly emarginate at the apex, with a long seta at one corner, 4 short setae at the other, and 3 subapical spines on the surface. In the second maxilla the terminal plate is distally narrowed and tipped with 5 setae. Attention may be called to the strong spine, bent at the end, on the apex of the third maxillipeds. Calman in 1906 points out that Bate separated his *Stochasmus exilis* from *Nematocarcinus* through mistaking this spine for a separate joint or "dactylos." Kemp in 1910 reduces *N. exilis* to the rank of a variety of *N. ensifer* (S. I. Smith). The figures which Kemp gives point to a near alliance, but not, I think, identity, between the forms *exilis* and *parvidentatus*. In the second maxillipeds a further point arises for consideration. In his figure Bate represents the second and third joints in complete coalescence, probably by inadvertence, as usually in this genus they are quite distinct, as shown in Smith's figure of *N. ensifer*. Yet in the specimen here described the separation is very incomplete, as shown in the figure. The first pleopod of the male, in place of an inner branch, has a wide membranaceous plate, with little hooks low down on the inner margin, as though it were a retinaculum in coalescence with a

simple branch. The second pleopod has two branches lying so closely one on the other that they are with difficulty drawn apart; in independent attachment to the peduncle is a process, on the inner side of the inner branch, which carries a slender piece about one-third the length of the ramus, having its lanceolate end densely fringed with setae. To this piece on the inner side near its base is attached a rather long retinaculum, distally armed with numerous hooks, its blunt end level with the base of the lanceolate apex just mentioned. There are obvious differences between this arrangement and the corresponding parts figured by Kemp for *N. exilis*.

The peduncle of the uropods on the outer side is apically acute. The inner ramus is lanceolate, much shorter than the broad outer ramus, the setose outer margin of which meets the sinuous faintly marked diaeresis with a very small tooth, within which is a larger spine, and beyond which the margin is continued to form a broadly rounded apex, fringed like the other available edges of both branches with long plumose setae. Total length of specimen about 70 mm., rostrum 5 mm., carapace with rostrum 19 mm., telson 10 mm.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1261.

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